

I claim:

1. A high shear rotating disc filter assembly in a filtering system for filtering a slurry comprised of liquid and very small particles, said filtering system having at least a feed tank with a slurry input means, a slurry output means, and a slurry recycle input means, a receiver tank, and a vacuum pump, comprising:

a plurality of rotating discs constructed of a porous material, each said disc having a hollow interior, each said disk being mounted on a shaft;

an elongated shaft for holding said discs, said shaft having a hollow interior, said shaft having a first end and a second end, said ends defining an elongated, longitudinal shaft axis, said second end being connected to said vacuum pump and said receiver tank, said first end being connected to a rotational drive means, said shaft having a plurality of elongated slots opening into said shaft hollow interior and into said disc interiors;

a liquid-tight vessel enclosing said discs and a portion of said shaft holding said discs, said vessel being connected to said feed tank slurry output means for receiving said slurry, said feed tank

having an output means connected to said feed tank
slurry recycle input means.

2. A high shear rotating disc filter assembly as recited in
claim 1, wherein:

said vessel has a top, a bottom, and a side wall
extending vertically upward from the bottom to the
top, said bottom, top and interconnecting side wall
defining a vessel interior, said vessel top and
bottom defining a vessel vertical axis;

wherein, the shaft first and second ends protrude
through the shaft side wall;

wherein, said portion of said shaft holding said discs
is positioned within the vessel so that the shaft
longitudinal axis is perpendicular to the vessel
vertical axis;

wherein, said slurry is pumped from the feed tank to a
vessel inlet located at the vessel bottom, said
slurry being fed continuously so as to affect an
overflow at the top of the vessel, said vessel top
having a recycle outlet which is piped back to the
feed tank top slurry recycle input means.

3. A high shear rotating disc filter assembly as recited in claim 2, wherein:

each disc has a round outer perimeter, a central radial opening, a first surface and an opposite second surface, said outer perimeter defining a disc radial plane, said surfaces, perimeter and central opening defining a disc interior, each said disc having a radial plane perpendicular to the longitudinal axis of the shaft, each said disc interior opening onto the central opening.

4. A high shear rotating disc filter assembly as recited in claim 3, wherein:

said shaft is further defined by a generally cylindrical wall with a plurality of elongated slots formed therein, each said slot opening into said shaft hollow interior, each said elongated slot having a longitudinal axis parallel with the longitudinal axis of the shaft.

5. A high shear rotating disc filter assembly as recited in claim 4, wherein:

each said disc has a hollow, disc-shaped hub insert with an outer perimeter fitted to and within each disc central radial opening, said hub perimeter having apertures formed therein establishing an opening between the disc interior and a hub interior, each hub having a central radial opening adapted to be fitted onto and about the shaft cylindrical wall, each hub having an impervious first surface and an impervious second surface, said surfaces, perimeter and central opening defining the hub hollow interior.

6. A high shear rotating disc filter assembly as recited in claim 5, wherein:

each said hub insert has a central neck formed on each surface about the central opening, said necks adapted to abut and fit against an adjacent hub neck;

wherein, a plurality of discs with hub inserts are stacked against each other onto said shaft, each hub neck abutting and fitting against an adjacent hub neck.

7. A high shear rotating disc filter assembly as recited in claim 6, further comprising:

an elastomeric seal installed between each abutting hub neck to insure liquid-tight junctions.

8. A high shear rotating disc filter assembly as recited in claim 7, further comprising:

said shaft cylindrical wall has an elongated flat surface strip parallel to the longitudinal axis of the shaft;

each hub insert central radial opening having a flat portion corresponding to said shaft elongated flat surface strip.

9. A high shear rotating disc filter assembly as recited in claim 8, further comprising:

a special seal installed about the shaft wall where the shaft protrudes through the vessel side wall.

10. A high shear rotating disc filter assembly as recited in claim 9, further comprising:

a diffuser plug may be installed at the inlet entry point of the vessel bottom, said diffuser plug adapted to evenly disperse slurry flow as slurry enters the vessel.

11. A high shear rotating disc filter assembly as recited in claim 10, wherein:

each filter disc is tapered with a greater separation between surfaces adjacent the central radial opening than at the outer perimeter.

12. A high shear rotating disc filter assembly as recited in claim 11, wherein:

said disc porous material is sintered metal.

13. A high shear rotating disc filter assembly as recited in claim 12, wherein:

said disc porous material is ceramic with finely structured openings.